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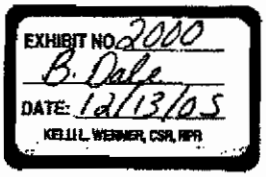

EXPERT REPORT

October 18, 2005

Bruce E. Dale, Ph. D.
2865 Hagadorn Road
Mason, MI 48854

In the matter of:

United States Fidelity and Guaranty Company and
Continental Insurance Company vs.
Brenntag West, Inc. et al

Case No. CV 04-29-BU-RFC

United States District Court

District of Montana- Billings Division

BASIS AND SUPPORTING INFORMATION

The expert opinions summarized in this report are based on my qualifications as a chemical engineer. I am a professor of chemical engineering and former Chair of the Department of Chemical Engineering and Materials Science at Michigan State University (East Lansing, Michigan). I have B.S. (*magna cum laude*), M.S. and Ph. D. degrees in the field of chemical engineering. Chemical engineering is that branch of engineering most closely connected with the production, use and properties of synthetic solvents such as perchloroethylene (perc), the contaminant at issue in this case. In addition, during the past ten years I have made an intensive focused study of spills, leaks and other discharges of perc and perc containing wastes. I have testified at trial on two occasions, have given five related depositions and provided eleven expert reports related to contamination issues dealing with perc.

This report is intended as a rebuttal of the expert report provided by Dr. Robert H. Harris regarding perc contamination at the Dyce Chemical site in Billings, Montana. Dr. Harris claims that a single large release in 1976 is responsible for the observed perc contamination at this site and gives no credence to any other possible causes of perc contamination. The facts of the case indicate otherwise, as I outline below.

SUMMARY OF OPINIONS AND SUPPORTING INFORMATION

A. ***Testimony in this case describes multiple spills, leaks and discharges of perc and other chemicals at the Dyce Chemical facility in Billings, Montana. Such releases of perc were common and expected by Dyce.***

   a. Perc was spilled or leaked during handling and storage operations at Dyce[1]. Such spills or leaks were routinely washed down with water into holding ponds built for that purpose[2,3,4,5].

   b. Perc was also cleaned from pumps, hoses, barrels, tankers and other equipment using water[6,7,8,9,10,11]. This water and the perc flowed into the holding ponds or containment areas[12,13,14].

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[1] Deposition of Marvin Johnson, August 29, 2001. Pg. 59, 61, 63, 67-70, 77, 198

[2] Suzanne Miller. July 23, 2000. Response to second EPA request for information under CERCLA Section 104e. Pg. 4

[3] Deposition of Donald Whaley, August 2, 2005. Pg. 79

[4] Deposition of Richard Brill, February 12, 2003. Pg. 13-14, 21

[5] Deposition of Marvin Johnson, August 29, 2001. Pg. 82

[6] Suzanne Miller. July 23, 2000. Response to second EPA request for information under CERCLA Section 104e. Pg. 5

[7] Suzanne Miller. July 23, 2000. Response to second EPA request for information under CERCLA Section 104e. Pg. 4

[8] Suzanne Miller. March 1, 2000. Notarized response to First EPA request for information under CERCLA Section 104e. Pg. 6

[9] Deposition of Richard Brill, February 12, 2003. Pg. 31, 34

[10] Deposition of Marvin Johnson, August 29, 2001. Pg. 31,34

[11] Deposition of Marvin Johnson, August 29, 2001. Pg. 45, 50

[12] Deposition of Suzanne Miller. Vol. 3. October 22, 2001. Pg. 88.

c. Unfortunately, hosing down perc spills or washing perc-containing equipment with water increased the likelihood of perc contamination of soil and groundwater at Dyce Chemical[15], as described below.

B. Spills and leaks of perc on concrete or asphalt at Dyce Chemical are very unlikely to have permeated through to the soil.

a. Perc evaporates much more rapidly than it permeates intact concrete[16,17,18]. Under conditions favoring maximum permeation of perc, it will still evaporate about 1000 times more rapidly than it will permeate concrete.

b. Perc is a good solvent for hydrocarbon compounds such as asphalt and will dissolve the hydrocarbon portion of asphalt. If spilled on asphalt, perc would dissolve some of the asphalt[19,20] and then would slowly evaporate from the resulting asphalt/perc mixture[21].

c. There is an alleged large spill of 250 gallons or more of perc on asphalt at Dyce Chemical in about 1976[22,23,24,25,26]. It is highly unlikely that such a perc spill actually occurred[27]. First, such a large spill of perc would have damaged or discolored a large area of asphalt. Employees questioned on the matter do not recall breakdown of asphalt[28,29]. Second, such a large spill of perc would have produced a strong odor over a large area and would almost certainly have been noted by Dyce employees or Dyce neighbors[30,31]. No testimony exists that such a significant, memorable odor was ever produced.

C. Perc discharged to ponds or basins where water is present will evaporate very slowly or not at all.

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[13] Deposition of Marvin Johnson, August 29, 2001. Pg. 34
[14] Deposition of Marvin Johnson, August 29, 2001. Pg. 200, 201
[15] Record of Decision, August 2005 Montana DEQ & US EPA, Fig. 7 & 8
[16] Suzanne Miller. July 23, 2000. Response to second EPA request for information under CERCLA Section 104e. Pg. 3
[17] Deposition of Thomas Cannon, September 30, 1997. Pg. 109
[18] Deposition of Franklin Agardy, January 8, 2005. Pgs. 40, 51
[19] Deposition of Marvin Johnson, August 29, 2001. Pg. 62, 248-249
[20] Deposition of Franklin Agardy, January 8, 2005. Pg. 69
[21] Deposition of Marvin Johnson, August 29, 2001. Pg. 284
[22] Letter from James Diede to Roxann Lincoln, November 25, 2002. D013140
[23] Site Investigation Report for Dyce Chemical prepared by Maxim Technologies, October 3, 2000. D104941
[24] Deposition of Desmond Slater, August 16, 2005. Pgs. 51-52, 59 & 101.
[25] Deposition of Monte Naff, August 3, 2005. Pg. 27
[26] Deposition of Rodney Halsten. May 17, 2005 pg. 121
[27] Deposition of Monte Naff, August 3, 2005. Pg. 103
[28] Suzanne Miller. July 23, 2000. Response to second EPA request for information under CERCLA Section 104e. Pg. 3
[29] Deposition of Monte Naff, August 3, 2005. Pg. 34
[30] Deposition of Monte Naff, August 3, 2005. Pg. 60
[31] Deposition of Monte Naff, August 3, 2005. Pg. 131

a. Dyce Chemical had a large catch pond lined with plastic[32] to catch chemical spills, rainwater and also water and chemical residues resulting from the washing of pumps, hoses, barrels, tankers and other equipment[33]. In about 1989 two additional ponds with concrete bottoms were constructed and used for the same purpose[34].
b. Perc is denser than water and is also more dense than most other hydrocarbon and chlorinated solvents[35]. Thus perc will sink to the bottom of ponds where water and/or other solvents are found. Such perc will be protected from evaporation by the layer of water and/or solvents.
c. Perc thus protected from evaporation could remain for years at the bottom of ponds and could eventually permeate through concrete over long periods of time. Perc would attack and eventually dissolve most plastic liners, thereby escaping to the underlying soil[36],[37].

PUBLICATIONS

My publications over the past 10 years are given below.

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[32] Deposition of Marvin Johnson, August 29, 2001. Pg. 28, 224
[33] Deposition of Marvin Johnson, August 29, 2001. Pg. 25-26
[34] Suzanne Miller. March 1, 2000. Notarized response to First EPA request for information under CERCLA Section 104e. Pg. 4
[35] Industrial and Engineering Chemistry, Product R&D. Vol. 16, Dec. 1977. pgs. 319-325
[36] Deposition of Richard Brill, February 12, 2003. Pg. 71
[37] Deposition of Marvin Johnson, August 29, 2001. Pg. 28

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COMPENSATION

Compensation is at the rate of $250 per hour. Expert testimony at depositions and courtroom appearances is charged at $375 per hour plus travel and related expenses.

LISTING OF PRIOR EXPERT TESTIMONY

1. Texas Industrial Services, Inc., et al. Vs. Houston General Insurance Company, Cause 93-036410 in the 125th Judicial District Court of Harris County, Texas. Subject: Contamination resulting from dry cleaning operations. Services Provided: Expert Report, Deposition and Trial Testimony. Retained by: Mr. John H. Boswell of Boswell, Hallmark and Brothers, PC, 1010 Lamar Street, Houston (phone 713-650-1600) Status: Concluded
2. Pilgrim Enterprises, Inc. vs. Kleen Rite, Inc., et al. Cause 95-54786 in the 215th Judicial District Court of Harris County, Texas. Subject: Contamination resulting from dry cleaning operations. Services Provided: Expert Report, Deposition and Trial Testimony. Status: Concluded.
3. Western Towing Company, et al, vs. M/V Maersk Shetland, et al. Civil Action No. C-95-175 in the United States District Court for the Southern District of Texas, Corpus Christi Division. Subject: Evaporation of spilled cumene in Corpus Christi Bay. Retained by: Ms. Debra Brewer Hayes, Fleming, Hovenkamp and Grayson, P. C., 1330 Post Oak Boulevard, Houston, Texas. Phone 713-621-7944. Services Provided: Expert Report, Deposition and Trial Testimony. Status: Concluded.
4. McDannald Ventures, Inc. vs. Robert M. Craig, et. al. Cause 97-51303 in the District Court of Harris County, Texas. Subject: Contamination resulting from dry cleaning operations. Services Provided: Expert Report. Retained by: Mr. John H. Boswell of Boswell, Hallmark and Brothers, PC, 1010 Lamar Street, Houston (phone 713-650-1600) Status: Concluded.
5. Charles Cantrell, et al. v. Toter, Inc., et al. Cause 91-12685 in the 167th Judicial District Court of Travis County, Texas. Subject: Intellectual property concerned with fermentation of plant carbohydrates. Services Provided: Expert Report and Deposition. Retained by: Mr. James L. Wright of Mithoff and Jacks, L.L.P. 111 Congress Avenue, Austin, Texas (phone 512-478-4422). Status: Concluded.
6. Oxy Petrochemicals, Inc. and Equistar Chemicals, LP vs. Air Liquide America et al. Cause No. 98-16891in the District Court of Harris County, Texas, 189th Judicial District. Subject: Failure of water conditioning equipment leading to loss of steam turbine. Services Provided: Affidavit. Retained by: Craig B. Glidden, Glidden Partners, L.L.P., 1111 Bagby, Houston, Texas. Status: Concluded
7. TCP Inwood Central Partners, vs. International Business Enterprises, Inc. et al. Cause 1999-49922 in the District Court of Harris County, Texas. Subject:

Contamination resulting from dry cleaning operations, performance of dry cleaning equipment. Services Provided: Expert Report. Status: Concluded.

8. MacDonald Highway 6 No. 2 Limited Partnership vs. The Dow Chemical Company, et al. Cause 2000-47824 in the District Court of Harris County, Texas. Subject: Contamination resulting from dry cleaning operations. Services Provided: Expert Report. Status: Concluded.
9. Citizens Insurance Company of America v. Puleo's Manufacturing. Case No. 96-20626 in Michigan. Subject: Flame retardant materials for artificial Christmas trees. Services Provided: Expert Report and Deposition. Status: Concluded.
10. Davis Enterprises, Inc. and Fairfield Publishing Co., vs. Mary Carrerre DBA Davis Cleaners, et al. Case No. CIV S- 99- 2010 GEB (GGH) in the United States District Court, Eastern District of California. Subject: Contamination resulting from dry cleaning operations. Services Provided: Expert Report. Status: Concluded.
11. RL & KM, Inc. vs. Team Enterprises, Inc. et al. Case No. CV-F-98-6363 REC (DLB) in the United States District Court, Eastern District of California. Subject: Contamination resulting from dry cleaning operations. Services Provided: Expert Report and Deposition. Status: Concluded
12. City of Modesto and City of Modesto Sewer District No. 1. Vs. The Dow Chemical Company, et. al. Case No. 999345 and 999643 in the Superior Court of the State of California in and for the County of San Francisco. Subject: Contamination resulting from dry cleaning operations. Services Provided: Expert Report and Deposition. Status: Currently Active.
13. Southeast Investments, Inc. V. Qahir S. Tharani, et al. Cause No: 2001-20587-158 158th Judicial District Court, Denton County, Texas. Subject: Contamination resulting from dry cleaning operations. Services Provided: Expert Report, Affidavits and Deposition. Status: Currently Inactive
14. Hartford Fire Insurance Company as subrogee of City of Port Huron v. Casco, Inc. et al. C. A. No. 02-60053 Hon. Marianne O. Battani, Troy, Michigan. Subject: Cause of fire in warehouse of corn gluten meal. Services provided: Expert report and deposition. Status: Concluded.
15. Vine Street, L.L.C. v. James R. Keeling. Civil Action No. 6:03CV 223 in the United States District Court for the Eastern District of Texas, Tyler Division. Subject: Contamination resulting from dry cleaning operations. Services Provided: Expert Report and Affidavits. Status: Currently active.
16. Franscell, et al v. Suehiro, et al. Case Number CV 96-8895 CBM in the United States District for the Central District of California. Subject: Contamination resulting from dry cleaning operations. Services Provided: Expert Report and Deposition. Status: Concluded.
17. Continental Casualty Co., et al. v. AmeriPride Services, Inc. Minnesota District Court Case No. CT 04-2506. Subject: Contamination resulting from dry cleaning operations. Services Provided: Expert Report, Deposition. Status: Concluded.
18. United States Fidelity and Guaranty Company & Continental Insurance Company vs. Brenntag West, Inc., Brenntag, Inc, Stinnes Corporation, and Brenntag Holding N. V. A. United States District Court for the District of Montana, Billings Division Case No. CV-04-29-BU-RFC. Subject: Contamination resulting from chemical storage and distribution facility. Services Provided: Expert Report. Status: Active

SIGNATURE

Bruce E. Dale, Ph. D.

October 18, 2005

Date

D

Expert's Report

United States Fidelity and Guaranty Company
and Continental Insurance Company
v.
Soco-West, Inc., Brilliant National Services, Inc. (f/k/a Brenntag, Inc.),
Stinnes Corporation, and Brenntag Holdings, N.V.

United States District Court
District of Montana
Billings Division
Cause Number CV-04-29-BLG-RFC

September 6, 2005

Prepared For

United States Fidelity and Guaranty Company

Prepared by:

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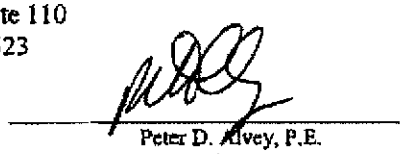

Peter D. Alvey, P.E.
Principal Engineer

ROUX

DEFENDANTS' 3/23/06 MOTION IN LIMINE # 3
ATTACHMENT D

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1.0 INTRODUCTION

This expert report regarding the Soco-West, Inc. (formerly Dyce Chemical, Inc) site in Billings, Montana (Dyce Chemical Facility or Site) and its immediate environs was prepared by Peter Alvey, P.E., Principal Engineer of Roux Associates, Inc. The report was prepared on behalf of United States Fidelity and Guaranty Company in connection with the above-captioned lawsuit.

Opinions reached in this report are based on the following:

- Discovery documents, testimony and other materials;
- Publicly available reports, maps, diagrams, aerial photographs and other documents; and,
- My professional experience, education and training in engineering and the remediation of contaminated sites.

I reserve the right to revise or supplement my opinions should new information, data, maps, documents, photographs or other materials become available, or if technical issues arise during the course of this litigation.

At trial, I expect to use various exhibits to assist in presenting my opinions. I am planning to use maps, diagrams, aerial photos, and excerpts from various documents, sampling data and tables.

My professional profile, which includes a listing of previous testimony, is found in Appendix A. My billing rate for this project is $210 per hour. A list of documents and materials reviewed is provided in Appendix B.

2.0 SITE DESCRIPTION AND HISTORY

The information provided in this section is a summarization of information provided by others. I did not complete an independent analysis of the history of the Dyce Chemical Facility.

2.1 Site Description And History

The information regarding the greater Lockwood Solvent Groundwater Plume Superfund site (LSS), specifically that portion of the LSS comprising the Dyce Chemical Facility, was obtained from, and available through, deposition testimony and documents produced during discovery in this case, the United States Environmental Protection Agency (USEPA) web page, and other sources of publicly available information.

The LSS is a 580-acre site located on the outskirts of Billings, in Yellowstone County, Montana, that has been found to have soils and groundwater contaminated with chlorinated solvents. The primary contaminants of concern are tetrachloroethene (PCE) and trichloroethene (TCE). On December 1, 2000, the LSS was officially placed on the USEPA National Priorities List.

Current land use within the LSS is characterized as residential, commercial and industrial, including trucking, vehicle repair/manufacturing, chemical repackaging, machine shops, and auto salvage. The Dyce Chemical Facility is located in the northern part of the LSS, referred to by USEPA as Area A.

The Site's industrial history began in 1967 as an herbicide blending plant, which was owned by Trekker Chemical Company and subsequently the Dow Chemical Company (Dow). Dow apparently manufactured herbicides, mainly 2,4-D. In 1972, Dow sold the site to Dyce Chemical, Inc. (then known as Dyce Sales & Engineering Services Company), which began chemical distribution operations in 1973, including receiving, repackaging, limited blending for various oil, utility, mining and dry cleaning customers. The Dyce Chemical Facility was purchased by an affiliate of Holland Chemical International (HCI) in 1989 and was known as HCI Dyce Chemical. In 2001, HCI Dyce

Chemical was acquired by Brenntag West, Inc., which later changed its name to Soco-West, Inc. (Soco-West).

The Dyce Chemical Facility consists of a 17-acre parcel that includes a main office, warehouses, storage buildings, drum storage areas, and tank farms used to store inorganic salts, acids, caustics, asphalt products, glycols, and chlorinated and non-chlorinated solvents. The chlorinated solvents historically handled at the facility include PCE, TCE, trichloroethene (TCA) and carbon tetrachloride. Chemical products are delivered to the Site via railcars, tank trailers, and less-than truckload quantities. The southern portion of the Site receives vehicle traffic and a railroad spur is located on the western portion of the Site. Some products are repackaged into 55-gallon drums or placed in bulk tanks, while other products are shipped or stored without repackaging. According to sworn documents provided by Soco-West to USEPA, repackaging, blending and transferring of chemicals are done with dedicated pumps, hoses and potable totes; however testimony of current or former employees (hereinafter, employees) indicates that this was not the case until the early 1990's. Above ground bulk storage tanks (ASTs) exist on-site that are constructed of steel, fiberglass or plastic. According to employee testimony, PCE was stored initially in a 1,500-gallon AST and subsequently in the 1980's, a 4,000-gallon AST, both used to transfer the PCE into 55-gallon drums for distribution to local customers. There is also testimony that a 150-gallon skid-mounted tank was used for storage of PCE in the 1970's. Employees testified that the 4,000-gallon tank had consistent inventory problems until the tank was re-lined, after which the inventory issues stopped. TCE (used in smaller quantities) that was delivered in bulk was transferred directly to drums. Soco-West stopped purchasing PCE and TCE at the Dyce Chemical Facility in approximately 2002, although small quantities of both chemicals are still stored on site in the warehouse in 55-gallon drums.

Employee testimony indicates that there were periodic releases of product at the Site through the rinsing of hoses and containers, return of product containers which were not completely empty and/or routine, day-to-day operations at the Site.

The first tank farm was constructed in 1978 and included a so-called "catch pond" or "catch-basin" to hold storm water and contain any releases or discharges of chemicals. Soco-West indicated in sworn responses to USEPA that this "catch basin" was unlined; however, employee testimony indicates otherwise. Around 1986, two additional concrete-lined evaporation ponds were constructed and the "catch pond" was filled in with "fly ash." The concrete ponds historically received storm water, any periodic releases of product during normal operations, and wastewater associated with washing equipment. Some effluent water from the ponds was discharged to the adjacent pasture. The two concrete ponds were filled in-place in 2002.

Alluvial deposits at the Dyce Chemical Facility consist primarily of a sequence of mixed silt, clay, and silty sands underlain by deposits of sand and gravel. These alluvial deposits overlay gray sandstone bedrock (approximately 30 feet below ground surface (bgs)). Vadose zone thickness is about 15 feet at the upper (southeast) portion of the Site, 10 feet at the Main Tank Farm Area (described below), and decreases to 7 feet northwest of the property. Moderate to low permeable silty clay and silty sand units were identified in the vadose zone throughout the Site with some discontinuous gravels in some borings.

The water-saturated zone extends from the sands and gravels at the base of the alluvium into the overlying finer grained sediments. The average saturated thickness of the saturated zone below the Site is 20 feet. The groundwater flow is generally toward the northwest with a horizontal gradient of 0.007 feet/feet.

Six surface water features are located downstream or downgradient of the Dyce Chemical Facility; the Coulson Irrigation ditch, the AJ Gravel Pond, the Corcoran Pond, the Lower Lockwood Irrigation ditch, a wetland area, and the Yellowstone River (approximately 2,000 feet downgradient of the Site). The water elevations in the ponds are a reflection of the water table elevations. The Yellowstone River is expected to intercept the groundwater discharging from the greater LSS.

2.2 Status of Investigations and Remedial Actions

The history of groundwater contamination at the LSS dates back to the mid 1980s. PCE, benzene, toluene, ethylbenzene and xylenes (BTEX), TCE, and dichloroethene (DCE) were detected in the groundwater in the vicinity of Lockwood Water Users Association municipal supply wells and eventually in monitoring wells placed up to one-mile east of the supply wells. Several possible contributors have been identified, including Soco-West/Dyce Chemical Facility.

In June 1998, the Montana Department of Environmental Quality (DEQ) conducted an investigation and sampled possible source areas upgradient from previously sampled contaminated wells, which included samples taken from the Dyce Chemical Facility. A second investigation was conducted in 1998-1999 that focused on identifying the potential sources of PCE in the Lomond Lane area. The PCE-related investigation of the Lomond Lane area continued into September 1999 with data suggesting PCE contamination originating from the Dyce Chemical Facility.

In the summer of 2002, Tetra Tech EM Inc. (TtEMI), under contract with the DEQ, began conducting fieldwork for the Remedial Investigation (RI), in accordance with EPA/DEQ/RD Cooperative Agreement. By June 2003, DEQ released the Final RI report, including risk assessments. Potential remedial alternatives were presented in the Feasibility Study (FS) report by TtEMI dated July 6, 2004.

The four contaminants of concern identified by USEPA for the LSS are PCE, TCE, DCE and vinyl chloride (VC). The northern part of the LSS (designated by USEPA as Area A), generally includes the area west of Klenck Lane; north of Taylor Place and the Coulson irrigation ditch; and south and east of the Yellowstone River. The Dyce Chemical Facility site is located in Area A. In Area A, concentrations of contaminants above site-specific soil screening levels were reported in vadose soil samples taken from four pilot test well boreholes, eleven soil borings, and six membrane interface probe boreholes. All of these sample locations are either within or downgradient of the Dyce Chemical Facility. Saturated soil with contaminant concentrations above site-specific

soil screening levels is considered a potential source for groundwater contamination. The chlorinated solvent plume in the alluvial aquifer extends from the Dyce Chemical Facility to the Yellowstone River. Based on analytical data taken from previous investigations (ATC 2003), the RI (TtEMI 2003), and from a supplemental membrane interface probe source investigation (TtEMI 2003), USEPA has identified four separate areas with high levels of chlorinated solvents in the soils:

(1) The Northwest Corner Area of the Dyce Chemical Facility;
(2) The Main Tank Farm Area located near the center of the Site;
(3) The Acid Tank Farm Area located just northwest of the Main Tank Farm Area; and,
(4) A smaller area immediately east of the Northwest Corner Area of the Dyce Chemical Facility.

These four areas are identified as orange-colored areas in the attached Figures 1 and 2. Of these four areas, all but the last one have levels of soil contamination indicative of being Non-Aqueous Phase Liquid (NAPL) contaminated areas.

In addition and important to the opinions presented in this report, PCE/TCE contamination has been detected in at least 100 separate samples collected at the Dyce Chemical Facility itself. As derived from the data through the investigations at the Site, there is widespread PCE/TCE contamination at the Site. However (as reported in the RI report), the limits of soil contamination at the Dyce site have not been fully delineated and additional testing may reveal yet additional areas of PCE/TCE contamination.

On August 24, 2005, the DEQ and USEPA released the Record of Decision (ROD) for LSS. Its ROD details DEQ's and USEPA's final determination for the components of the Selected Remedy for cleanup at the LSS. Such components include excavation and thermal treatment, soil vapor extraction, and in-situ chemical oxidation of contaminated soils, and containment and treatment of contaminated groundwater with enhanced bioremediation and a treatment barrier.

3.0 OPINIONS

Based on the materials received and reviewed (as listed in Appendix B), as well as my understanding of the Site history presented in Section 2.0 above, I expect to provide the following opinions along with expert testimony in support. The principal bases for these opinions are specifically highlighted below.

Opinion 1. Soco-West alleges *"that a sudden and accidental spill of 250 to 1,000 gallons of perchloroethlyene ("perc") happened at the Dyce site at some time during 1975, 1976 or 1977."* (Italics added) (hereinafter, referred to as the alleged spill.) In my opinion the contamination at the Site is inconsistent, and not the result of the alleged spill. The alleged spill, if it actually occurred, is not the sole cause of PCE/TCE contamination at the Dyce Chemical Facility.

Bases for Opinion 1.

- Results from investigations of soil and groundwater are consistent with frequent releases of relatively small quantities of chlorinated solvents in chemical storage areas and handling areas. The groundwater data reviewed indicates the presence of little or no DNAPL in the groundwater within the operational area of the Dyce Chemical Facility. DNAPL was not reported to have been encountered at any groundwater sampling locations. The concentrations of PCE and other chlorinated solvent compounds dissolved in the groundwater at the Site are generally lower than those that would be indicative of the presence of DNAPL.

- There is evidence of relatively small releases (i.e. less than 5 gallons) that may have occurred at the Site as a result of normal operations. Threre are no reports, however, of major releases (i.e. five gallons or more) of PCE or any other chlorinated hydrocarbon compounds which would contribute to the presence of DNAPL at the Site.

- In responses to USEPA, Soco-West stated under oath that it was not aware, and had no records, of any major releases of PCE/TCE at the Site.

- Employees indicated that any releases at the Site prior to 1987 would eventually have been collected at the "catch pond," and subsequently, within the concrete evaporation ponds.

- Employees testified to having seen minor amounts of PCE/TCE residuals in returned drums being emptied onto the ground along the railroad tracks near the old "catch pond."

- Soco-West interviewed employees to determine whether they had recollection of past discharges, and in particular of PCE or TCE. None of the individuals interviewed had any knowledge of any reportable quantity spill or release of PCE or TCE to the environment.

- Between approximately 1972 – 1989, any large quantity of spilled product (e.g. like the alleged spill) would have drained into the tank farm cement containment area. The slope of this area is such that drainage goes into these containment areas.

- According to employee testimony, if an employee spilled chemicals frequently, that employee usually faced some sort of disciplinary action. The existence of such a policy tends to indicate that a problem existed at the Site with regard to frequent discharges of chemicals on an operational basis.

- Internal policies in place required reporting of spills. No evidence of major spills reports was found in the records or depositions.

- PCE/TCE contamination has been detected in at least 100 separate samples collected at the Dyce Chemical Facility. As derived from data through the USEPA and MDEQ investigations at the Site, there is widespread PCE/TCE contamination at the Site. These findings are inconsistent with the alleged spill.

Opinion 2. Evidence indicates that the loading/unloading area immediately to the south of the Main Tank Farm Area was asphalt paved as early as 1975. Assuming this to be the case when the alleged spill occurred, and further, that the alleged spill occurred at the loading/unloading area, in my opinion there would have been severe, readily noticeable deterioration of the asphalt surface. In my opinion the absence of asphalt deterioration in loading/unloading area is inconsistent with the alleged spill.

Bases for Opinion 2.

- Employees testified that the loading/unloading area south of the Main Tank Farm Area was paved with asphalt until approximately 1988, when it was replaced with concrete.

- I am aware of no evidence of asphalt deterioration that is consistent with the alleged spill.

- Chlorinated solvents are typically used in testing of asphalt materials to extract the bitumen from the paving material and are also known to have an adverse effect if spilled on asphalt paving.

Opinion 3. In my opinion, there are multiple, separate and distinct areas of PCE and/or TCE contamination at the Dyce Chemical Facility, the characteristics of which indicate that those areas of contamination resulted from multiple, separate and distinct causes.

Bases for Opinion 3.

- USEPA has identified four separate areas with high levels of chlorinated solvents in the soils: the Northwest Corner Area, the Main Tank Farm Area, the Acid Tank Farm Area and a smaller area immediately east of the Northwest Corner Area. Of these four, all but the last have levels of contamination in the soil, which are indicative of being NAPL contaminated areas. These areas are shown on attached Figures 1 and 2.

- As illustrated on Figure 4-2 included in the Feasibility Study (FS) report, the two areas with the greatest soil contamination are the Main Tank Farm Area and the Northwest Corner Area of the Dyce Chemical Facility. The Acid Tank Farm Area and the area immediately east of the Northwest Corner Area contain smaller areas of soil contamination.

- The concentrations of chlorinated volatile organic compounds (VOCs) detected in groundwater in the Northwest Corner Area of the Site are significantly higher than those detected in the operational area of the Site and are indicative of a separate and distinct source area near the Northwest Corner Area. In addition, the virtual absence of the aromatic hydrocarbon compounds BTEX confirm the separate source characteristics of the contamination in the Northwest Corner Area.

- Operations at the "catch pond" do not appear to be the principal source of the contaminants found in the Northwest Corner Area of the Site. However, there is evidence that liquid in the catch pond was occasionally pumped or otherwise intentionally discharged into the pasture in the vicinity of the Northwest Corner Area.

- BTEX concentrations in the soil and groundwater near the Main Tank Farm are much higher than found in other areas of the Site.

Opinion 4. In my opinion, there is an area of BTEX, PCE and TCE contamination near the center of the Dyce Chemical Facility, which is attributable to operations at the Main Tank Farm Area. This contamination was likely caused by periodic releases at the Main Tank Farm Area during the normal course of operations. These releases likely occurred beginning no later than 1974, by which time the above ground storage tank farm had been constructed at the Site, and continued for many years thereafter.

Bases for Opinion 4.

- According to aerial photographs dated June 18, 1974, several above ground storage tanks existed in the Main Tank Farm Area. No tanks are shown on an aerial photo dated August 18, 1971. Copies of these aerial photos are included as Figures 3 and 4.
- A PCE-NAPL contaminated source area was identified in boring MP104 (TtEMI 2003c). Soil contamination was encountered in the vadose soil immediately below the pavement. PCE concentrations in two soil samples collected from 2 to 4 and from 6 to 8 feet bgs, were 260 and 4,670 mg/kg, respectively. Groundwater samples collected from boring BHM contained cis-1,2-DCE ranging from 173 to 86,000 ug/L as well as high concentrations of toluene (210,000 ug/L). These data suggest that the PCE detected in vadose zone soil samples MP104 has undergone biodegradation to cis-1,2-DCE in the saturated zone. (FS, TtEMI 2004).
- BTEX concentrations in the soil and groundwater near the Main Tank Farm Area are much higher than found in other areas of the Site.

Opinion 5. In my opinion, an area of PCE and TCE contamination exists north of the Main Tank Farm Area, in the Acid Tank Farm Area. This contamination cannot be explained by the alleged spill.

Bases for Opinion 5.

- A PCE-NAPL area was identified in MIP boring MP105, in the Acid Tank Farm Area. The MIP log indicates elevated VOC concentrations immediately above bedrock in the sand and gravel aquifer. The groundwater sample collected from the interval above bedrock contained high concentrations of PCE (2,600 ug/L), with low concentrations of TCE and cis-1,2-DCE. This concentration exceeds 1 percent solubility of PCE (1,500 ug/L) and may indicate the presence of NAPL.

- One groundwater sample collected from boring BHF at 14 feet bgs contained PCE at 13,000 ug/L, which also exceeds a 1 percent solubility of PCE. This boring immediately southwest of the Acid Tank Farm Area may indicate yet another area of PCE contamination.
- The areal extent of contamination found in the Acid Tank Farm Area is not consistent with the alleged spill.

Opinion 6. In my opinion, there is an area of PCE and TCE contamination in the Northwest Corner Area of the Site. It is my further opinion that the source of this contamination is likely due, at least in part, to historical runoff from operational portions of the Site, which was captured by ditches and discharged in this undeveloped portion of the Site. Such contamination is not consistent with the alleged spill. Other contributing factors to PCE/TCE contamination in the Northwest Corner Area likely include: overflow or discharges from the "catch pond" and/or evaporation ponds used historically on-site to collect runoff and migration of contamination from other source areas on-site.

Bases for Opinion 6.

- From an evaluation of soil sample and MIP data, a PCE-NAPL contaminated source area was identified in the Northwest Corner Area of the Dyce Chemical Facility (TtEMI 2003c). The main area of contamination is located in the area of monitoring well PT002. Vadose zone contamination (less than 5 feet bgs) was identified in boring MP114 and MP139 and likely represents the surface release location. NAPL contamination appears to have spread horizontally below the water table in the silty clay and silty sand overlying the more permeable sand and gravel unit.
- A smaller area of contamination was detected in the vicinity of PT001 and MP132.

Opinion 7. In my opinion, there may be other areas of PCE, TCE and other contamination at the Site other than those identified above. These additional areas include historical drainage ditches and ponds, previous

above ground storage tank locations, railroad spur, drum storage/PCE handling areas, and adjacent to buildings. Such additional contamination would not be consistent with the alleged spill.

Bases for Opinion 7.

- The limits of soil contamination at the Dyce Chemical Facility have not been fully delineated and additional work is proposed to address data gaps.
- Some data gaps have been identified by USEPA and additional work is recommended at the Site (in Area A), by USEPA, to address these data gaps.
- Historic aerial photographs show various Site features such as drainage ditches, catch ponds, relocated above ground storage tanks, and other unidentified objects that have not been adequately addressed.
- As described above, numerous samples from within the Site in areas other than the four areas depicted in Figures 1 and 2 indicate the existence of PCE/TCE contamination.